Studybeesofficial

Where Minds Pollinate

Class 11

Mathematics

Chapter 2

Review Exercise 2

Notes

National Book Foundation

Now $B = A^{-1}C$.

$$A^{-1} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 0 & 1 \\ -1 & 1 & 0 \end{bmatrix}$$

$$B = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 0 & 1 \\ -1 & 1 & 0 \end{bmatrix} \begin{bmatrix} & & \\ & & \\ & & \end{bmatrix}$$

B = 16 1 11 9 19 20 1 14

Decoded = PAKISTAN

Ch# 2. Review Exercise

(2) Sol

$$A = \begin{bmatrix} 1 & 2 & 0 \\ -3 & 4 & 9 \\ 2 & 1 & 6 \end{bmatrix}$$

$$A_{13} = (-1)^{1+3} \begin{vmatrix} -3 & 4 \\ 2 & 1 \end{vmatrix}$$

$$\boxed{A_{13} = -11}$$

$$A_{23} = -(1-4) \Rightarrow \boxed{3}$$

$$A_{33} = (-1)^{3+3} \begin{vmatrix} 1 & 2 \\ -3 & 4 \end{vmatrix}$$

$$= \boxed{10}$$

$|A| = 0 + 9(3) + 6($

$= 27 + 60$

$\boxed{|A| = 87}$.

(3) Prove $A^{-1} = A^t$ then $|AA^t| = 1$

Sol

Proof Given

$A^{-1} = A^t$

$AA^{-1} = AA^t$ $\quad\times A$ on b/s

$I = AA^t$ $\quad\therefore AA^{-1} = I$

Taking det on b/s

$|AA^t| = |I|$ $\quad I =$ Identity matrix

$|AA^t| = 1$ $\quad |I| = 1$ (always)

(4) $\begin{vmatrix} a+l & l & l \\ l & a+l & l \\ l & l & a+l \end{vmatrix} = (a+l+2l)(a+l-l)^2.$

Sol L.H.S $= \begin{vmatrix} a+l+2l & l & l \\ a+l+2l & a+l & l \\ a+l+2l & l & a+l \end{vmatrix}$ $C_1 + (C_2 + C_3)$

$a+l+2l \begin{vmatrix} 1 & l & l \\ 1 & a+l & l \\ 1 & l & a+l \end{vmatrix}$

$(a+l+2l) \begin{vmatrix} 1 & l & l \\ 0 & a & 0 \\ 1 & l & a+l \end{vmatrix}$ $R_2 - R_1$.

$(a+l+2l) \begin{vmatrix} 1 & l & l \\ 0 & a+l-l & 0 \\ 0 & 0 & a+l-l \end{vmatrix}$ $R_3 - R_1$

$(a+l+2l)|a+l+l|^2 =$ R.H.S

(Q5) $2x-3y+z=1$

$x-2y+\alpha z=2$

$3y+z=-1.$

Sol

$$A=\begin{bmatrix} 2 & -3 & 1 \\ 1 & -2 & \alpha \\ 0 & 3 & 1 \end{bmatrix}$$

Exp

$|A| = 2(-2-3\alpha)-1(-3-3)$

$= 4-6\alpha+6$

$|A|=0 \Rightarrow 2-6\alpha=0$

$\boxed{\alpha = \frac{2}{6}}$

$\boxed{\alpha = \frac{1}{3}}$

now

$$\left[\begin{array}{ccc|c} 1 & -2 & \frac{1}{3} & 2 \\ 2 & -3 & 1 & 1 \\ 0 & 3 & 1 & -1 \end{array}\right] \quad R_1 \leftrightarrow R_2.$$

$$A{:}B = \left[\begin{array}{ccc|c} 1 & -2 & \frac{1}{3} & 2 \\ 0 & 1 & \frac{1}{3} & -3 \\ 0 & 3 & 1 & 1 \end{array}\right] \quad R_2-2R_1$$

$$\left[\begin{array}{ccc|c} 1 & -2 & \frac{1}{3} & 2 \\ 0 & 1 & \frac{1}{3} & -3 \\ 0 & 0 & 0 & 8 \end{array}\right] \quad R_3-3R_2$$

Here Rank $A \neq$ Rank A_b

i.e. $2 \neq 3$

so system is inconsistent so no solution